AMENDMENTS TO THE CLAIMS

1-6. (Cancelled)

7. (Currently Amended) ~~The deinterlacing method of Claim 1,~~ A deinterlacing method for converting an interlaced image into a progressive image, said method comprising:

performing a filtering process to pixels of at least one of three fields, a deinterlacing target field to be subjected to a deinterlacing process and forward and backward fields of the deinterlacing target field within the interlaced image so as to generate an interpolation pixel for the deinterlacing target field;

measuring a quantity of motion of the deinterlacing target field; and

changing a filter coefficient of a filter used in the filtering process based on the quantity of the motion measured in said measuring of the quantity of motion,

wherein in said ~~deciding of the filter coefficient, the filter coefficient of the filter used in the filtering process is~~ changing of the characteristics of the filtering, the characteristics of the filtering are changed so that gain of components from the forward and backward fields of the deinterlacing target field is reduced as the quantity of the motion measured in said measuring of the quantity of motion is increased.

8. (Currently Amended) ~~The deinterlacing method of Claim 1,~~ A deinterlacing method for converting an interlaced image into a progressive image, said method comprising:

performing a filtering process to pixels of at least one of three fields, a deinterlacing target field to be subjected to a deinterlacing process and forward and backward fields of the deinterlacing target field within the interlaced image so as to generate an interpolation pixel for the deinterlacing target field;

measuring a quantity of motion of the deinterlacing target field; and

changing a filter coefficient of a filter used in the filtering process based on the quantity of the motion measured in said measuring of the quantity of motion,

wherein in said ~~deciding of the filter coefficient, the filter coefficient of the filter used in the filtering process is~~ changing of the characteristics of the filtering, the characteristics of the filtering are changed so that gain of components from the forward and backward fields of the deinterlacing target field is reduced to zero when the quantity of the motion measured in said measuring of the quantity of motion is ~~large~~increased.

9. (Cancelled)

10. (Previously Presented) A deinterlacing apparatus for converting an interlaced image into a progressive image, said apparatus comprising:

a frame memory for storing the interlaced image;

a filter unit for receiving, from said frame memory, a deinterlacing target field to be subjected to a deinterlacing process and one or both of forward and backward fields of the deinterlacing target field within the interlaced image, and performing a filtering process to pixels of at least one of the received fields so as to generate an interpolation pixel for the interlacing target field;

a difference operation unit for receiving, from said frame memory, the deinterlacing target field or a frame including the deinterlacing target field, and a field or frame which is adjacent to the deinterlacing target field or frame including the deinterlacing target field within the interlaced image and operating a difference therebetween so as to measure a quantity of motion of the deinterlacing target field;

a filter coefficient setting unit for changing filter characteristics of said filter unit based on the quantity of the motion measured by said difference operation unit; and

a double-speed converter for composing the interlaced image and the interpolation pixel generated by said filter unit, and generating the progressive image.

11. (Previously Presented) A deinterlacing method for performing a decoding process to a code sequence, field by field or frame by frame, which code sequence is obtained by coding an interlaced image composed of plural fields using motion compensation, and converting a decoded image of the interlaced image, which is obtained by the decoding process, into a progressive image, said method comprising:

decoding the interlaced image so as to obtain the decoded image and to obtain a motion vector at the motion compensation which indicates a prescribed reference field for a target field;

converting a motion vector for each of the fields, having a size corresponding to a time interval between the target field and the prescribed reference field, into a motion vector of a size corresponding to a time interval of a fixed unit;

obtaining pixels from reference fields which are forward and backward fields of a deinterlacing target field to be subjected to a deinterlacing process based on the motion vectors converted in said converting of the motion vector, and generating a first interpolation pixel for the deinterlacing target field;

generating a second interpolation pixel by using pixels in the deinterlacing target field;

deciding a weighting factor which indicates a weighting ratio between the first interpolation pixel and the second interpolation pixel; and

obtaining a weighted mean of the first interpolation pixel and the second interpolation pixel by using the weighting factor decided in said deciding of the weighting factor so as to generate a third interpolation pixel, and interpolating the decoded image by using the third interpolation pixel so as to generate the progressive image.

12. **(Previously Presented)** A deinterlacing method for performing a decoding process to a code sequence, field by field or frame by frame, which code sequence is obtained by coding an interlaced image composed of plural fields using motion compensation, and converting an decoded image of the interlaced image, which is obtained by the decoding process, into a progressive image, said method comprising:

decoding the interlaced image so as to obtain the decoded image and to obtain a motion vector at the motion compensation which indicates a prescribed reference field for a target field;

a converting a motion vector for each of the fields having a size corresponding to a time interval between the target field and the prescribed reference field into a motion vector of a size corresponding to a time interval of a fixed unit;

judging an effectiveness of the motion vectors converted in said converting of the motion vector;

obtaining pixels from reference fields which are forward and backward fields of a deinterlacing target field to be subjected to a deinterlacing process based on the motion vectors converted in said converting of the motion vector and a result of the judgment in said judging of the effectiveness of the motion vectors, and generating a first interpolation pixel for the deinterlacing target field;

generating a second interpolation pixel by using pixels in the deinterlacing target field;

deciding a weighting factor which indicates a weighting ratio between the first interpolation pixel and the second interpolation pixel; and

obtaining a weighted mean of the first interpolation pixel and the second interpolation pixel by using the weighting factor so as to generate a third interpolation pixel, and interpolating the decoded image by using the third interpolation pixel so as to generate the progressive image.

13. (Previously Presented) The deinterlacing method of Claim 11 or 12, wherein the time interval of a fixed unit in said converting of the motion vector is a time interval which is equivalent to one field.

14. (Previously Presented) The deinterlacing method of Claim 11 or 12, wherein processes in said generating of the first interpolation pixel, the deciding of the weighting factor and said obtaining of the weighted mean and interpolating of the decoded image so as to generate the progressive image are carried out in units, which unit is smaller than a unit of an image accompanied by the motion vector at the motion compensation.

15. (Previously Presented) The deinterlacing method of Claim 11 or 12, wherein the code sequence is a code sequence which is coded by an MPEG method.

16. (Previously Presented) The deinterlacing method of Claim 11 or 12, wherein in said converting of the motion vector, when a distance between lines in a frame structure

is one pixel, the motion vector is converted so that vertical components of the motion vector have an even number.

17. (Previously Presented) The deinterlacing method of Claim 12, wherein in said judging of the effectiveness of the motion vector, when the size of the motion vector converted in said converting of the motion vector is equal to or smaller than a predetermined value, the motion vector is judged to be effective.

18. (Previously Presented) The deinterlacing method of Claim 12, wherein in said judging of the effectiveness of the motion vector, when a distance between lines in a frame structure is one pixel, a motion vector which has even-numbered vertical components from among the motion vectors converted in said converting of the motion vector is judged to be effective.

19. (Previously Presented) The deinterlacing method of Claim 11, wherein in said obtaining of the pixels and generating of the first interpolation pixel, an evaluation scale for selecting an optimum motion vector for the generation of the first interpolation pixel is calculated by using the motion vectors converted in said converting of the motion vector, and the first interpolation pixel is generated by using a motion vector with which the best evaluation scale is obtained.

20. (Previously Presented) The deinterlacing method of Claim 11, wherein

in said obtaining of the pixels and generating of the first interpolation pixel, an evaluation scale for selecting an optimum motion vector for the generation of the first interpolation pixel is calculated by using the motion vector converted in said converting of the motion vector and a motion vector in the opposite direction to the motion vector, and the first interpolation pixel is generated by using a motion vector with which the best evaluation scale is obtained, and

the motion vector in the opposite direction is a motion vector which is in the opposite direction to the motion vector converted in said converting of the motion vector,

and indicates a reference field in an opposite forward/backward relationship to the reference field indicated by the motion vector with respect to the target field.

21. (Previously Presented) The deinterlacing method of Claim 12, wherein in said obtaining of the pixels and generating of the first interpolation pixel, an evaluation scale for selecting, from among the motion vectors converted in said converting of the motion vector, an optimum motion vector for the generation of the first interpolation pixel is calculated by using a motion vector which is judged to be effective in said judging of the effectiveness of the motion vectors, and the first interpolation pixel is generated in said obtaining of the pixels and generating of the first interpolation pixel by using a motion vector with which the best evaluation scale is obtained.

22. (Previously Presented) The deinterlacing method of Claim 12, wherein

said obtaining of the pixels and generating of the first interpolation pixel, an evaluation scale for selecting, from among the motion vectors converted in said converting of the motion vector, an optimum motion vector for the generation of the first interpolation pixel is calculated by using an effective motion vector which is judged to be effective in said judging of the effectiveness of the motion vectors and a motion vector in the opposite direction to the effective motion vector, and the first interpolation pixel is generated in said obtaining of the pixels and generating of the first interpolation pixel by using a motion vector with which the best evaluation scale is obtained, and

the motion vector in the opposite direction is a motion vector which is in the opposite direction to the effective motion vector, and indicates a reference field in an opposite forward/backward relationship to the reference field indicated by the effective motion vector with respect to the target field.

23. (Previously Presented) The deinterlacing method of any one of Claims 19 to 22, wherein in said obtaining of the pixels and generating of the first interpolation pixel, an evaluation scale for selecting an optimum motion vector for the generation of the first interpolation pixel is calculated by using the motion vector converted in said converting of the motion vector and a motion vector having no motion, and the first interpolation

pixel is generated in said obtaining of the pixels and generating of the first interpolation pixel by using a motion vector with which the best evaluation scale is obtained.

24. (Previously Presented) The deinterlacing method of any one of Claims 19 to 22, wherein the evaluation scale is a sum of absolute values of differences between pixels of the reference field which is indicated by the motion vector converted in said converting of the motion vector and the second interpolation pixels.

25. (Previously Presented) The deinterlacing method of Claim 23, wherein the evaluation scale is a sum of absolute values of differences between pixels of the reference field which is indicated by the motion vector converted in said converting of the motion vector and the second interpolation pixels.

26. (Previously Presented) The deinterlacing method of any one of Claims 20 to 22, wherein the evaluation scale is a sum of absolute values of differences between pixels of the reference field which is indicated by the motion vector converted in said converting of the motion vector and pixels of a reference field which is indicated by the motion vector in the opposite direction.

27. (Previously Presented) The deinterlacing method of any one of Claims 20 to 22, wherein

in said obtaining of the pixels and generating of the first interpolation pixel, an evaluation scale for selection an optimum motion vector for the generation of the first interpolation pixel is calculated by using the motion vector converted in said converting of the motion vector and a motion vector having no motion, and the first interpolation pixel is generated in said obtaining of the pixels and generating of the first interpolation pixel by using a motion vector with which the best evaluation scale is obtained, and

the evaluation scale is a sum of absolute values of differences between pixels of the reference field which is indicated by the motion vector converted in said converting of the motion vector and pixels of the reference field which is indicated by the motion vector of the opposite direction.

28. (Previously Presented) A deinterlacing method for generating an interpolation pixel for an interlaced image which is composed of plural fields, using pixels in each of the fields, and converting the interlaced image into a progressive image, said method comprising:

detecting a direction indicated by a line passing through a position to be interpolated where the interpolation pixel is generated and connecting peripheral pixels of the position to be interpolated, as a direction of an edge;

obtaining a strongness of a correlation between pixels existing in the direction of the edge, as a reliability of the edge; and

generating the interpolation pixel by using the pixels existing in the direction of the edge when the reliability of the edge is equal to or larger than a predetermined value, and generating the interpolation pixel by using pixels existing in upper and lower directions of the position to be interpolated when the reliability of the edge is smaller than the predetermined value.

29. (Previously Presented) The deinterlacing method of Claim 11 or 12, wherein said generating of the second interpolation pixel includes:

detecting a direction indicated by a line passing through a position to be interpolated where the second interpolation pixel is generated, and connecting peripheral pixels of the position to be interpolated, as a direction of an edge;

obtaining a strongness of a correlation between pixels existing in the direction of the edge, as a reliability of the edge; and

generating the second interpolation pixel by using the pixels existing in the direction of the edge when the reliability of the edge is equal to or larger than a predetermined value, and generating the second interpolation pixel by using pixels existing in upper and lower directions of the position to be interpolated when the reliability of the edge is smaller than the predetermined value.

30. (Previously Presented) The deinterlacing method of Claim 28, wherein in said obtaining of the strongness of the correlation between pixels existing in the direction of

the edge, when a difference between the pixels existing in the direction of the edge is smaller than a difference between the pixels existing in the upper and lower directions of the position to be interpolated, the reliability of the edge is judged to be equal to or larger than the predetermined value.

31. (Previously Presented) The deinterlacing method of Claim 29, wherein in said obtaining of the strongness of the correlation between pixels existing in the direction of the edge, when a difference between the pixels existing in the direction of the edge is smaller than a difference between the pixels existing in the upper and lower directions of the position to be interpolated, the reliability of the edge is judged to be equal to or larger than the predetermined value.

32. (Previously Presented) The deinterlacing method of Claim 28, wherein in said obtaining of the strongness of the correlation between pixels existing in the direction of the edge, when the interpolation pixel value which is obtained by using the pixels existing in the direction of the edge is a value between values of the pixels existing in the upper and lower directions of the position to be interpolated, the reliability of the edge is judged to be equal to or larger than the predetermined value.

33. (Currently Amended) The deinterlacing method of Claim 29, wherein in said obtaining of the strongness of the correlation between pixels existing in the direction of the edge, when the interpolation pixel value which is obtained by using the pixels in the direction of the edge is a value between values of the pixels existing in the upper and lower directions of the position to be interpolated, the reliability of the edge is judged to be equal to or larger than the predetermined value.

34. (Previously Presented) The deinterlacing method of Claim 11 or 12, wherein for an intra-coded deinterlacing target image area in the deinterlacing target field, the deinterlacing process is performed in said obtaining of pixels from reference fields which are forward and backward fields of the deinterlacing target field by using a motion vector which accompanies a peripheral image area positioned around the deinterlacing target

image area or an image area in a frame immediately preceding or immediately following the deinterlacing target field, which image area is at the same position as that of the deinterlacing target image area.

35. (Previously Presented) The deinterlacing method of Claim 11 or 12, wherein, when the code sequence which is decoded in said decoding of the interlaced image is recorded on a recording medium and read in a fast-forward or fast-rewind mode, the decoded image is interpolated by using only the second interpolation pixel generated in said generating of the second interpolation pixel so as to generate the progressive image.

36. (Previously Presented) A deinterlacing apparatus for performing a decoding process to a code sequence obtained by coding an interlaced image which is composed of plural fields using motion compensation, field by field or frame by frame, and converting a decoded image of the interlaced image, which is obtained by the decoding process, into a progressive image, said apparatus comprising:

a decoder for decoding the interlaced image so as to obtain the decoded image and to obtain a motion vector at the motion compensation which indicates a prescribed reference field for a target field;

an image memory for storing the decoded image;

a parameter memory for storing the motion vector;

a motion vector converter for converting a motion vector for each of the fields, having a size corresponding to a time interval between the target field and the prescribed reference field, which is read from said parameter memory, into a motion vector of a size corresponding to a time interval of a fixed unit;

an inter-field interpolation pixel generator for obtaining pixels from reference fields which are forward and backward fields of a deinterlacing target field to be subjected to a deinterlacing process based on the motion vectors converted by said motion vector converter, and generating a first interpolation pixel for the deinterlacing target field;

an intra-field interpolation pixel generator for generating a second interpolation pixel by using pixels in the deinterlacing target field;

a weighting factor decision unit for deciding a weighting factor which indicates a weighting ratio between the first interpolation pixel and the second interpolation pixel; and

a progressive image generator for obtaining a weighted mean of the first interpolation pixel and the second interpolation pixel by using the weighting factor so as to generate a third interpolation pixel, and interpolating the decoded image read from said image memory by using the third interpolation pixel so as to generate the progressive image.

37. **(Previously Presented)** A deinterlacing apparatus for performing a decoding process to a code sequence obtained by coding an interlaced image which is composed of plural fields using motion compensation, field by field of frame by frame, and converting a decoded image of the interlaced image, which is obtained by the decoding process, into a progressive image, said apparatus comprising:

a decoder for decoding the interlaced image so as to obtain the decoded image and to obtain a motion vector at the motion compensation which indicates a prescribed reference field for a target field;

an image memory for storing the decoded image;

a parameter memory for storing the motion vector;

a motion vector converter for converting a motion vector for each of the fields, having a size corresponding to a time interval between the target field and the prescribed reference field, which is read from said parameter memory, into a motion vector of a size corresponding to a time interval of a fixed unit;

a motion vector judgment unit for judging an effectiveness of the motion vectors converted by said motion vector converter;

an inter-field interpolation pixel generator for obtaining pixels from reference fields which are forward and backward fields of a deinterlacing target field to be subjected to a deinterlacing process based on the motion vectors converted by said motion vector converter and a result of the judgment by said motion vector judgment unit, and generating a first interpolation pixel for the deinterlacing target field;

an intra-field interpolation pixel generator for reading pixels in the deinterlacing target field so as to generate a second interpolation pixel;

a weighting factor decision unit for deciding a weighting factor which indicates a weighting ratio between the first interpolation pixel and the second interpolation pixel; and

a progressive image generator for obtaining a weighted mean of the first interpolation pixel and the second interpolation pixel by using the weighting factor so as to generate a third interpolation pixel, and interpolating the decoded image read from said image memory by using the third interpolation pixel so as to generate the progressive image.

38. (Currently Amended) The deinterlacing method of ~~Claim 1~~Claim 7, wherein a filter which is used in said performing of the filtering process so as to generate the interpolation pixel has characteristics of extracting vertical low frequency components of the deinterlacing target field, and extracting vertical high frequency components of the forward and backward fields of the deinterlacing target field.

39. (Cancelled)

40. (New) The deinterlacing method of claim 7, wherein in said performing of the filtering process so as to generate the interpolation pixel, pixels in the deinterlacing target field or peripheral fields, which are in the same horizontal position as that of a position to be interpolated, are subjected to the filtering process.

41. (New) The deinterlacing method of claim 7, wherein in said measuring of the quantity of the motion, the quantity of the motion is obtained from a difference between the deinterlacing target field or a frame including the deinterlacing target field, and another field or frame.

42. (New) The deinterlacing method of claim 7, wherein in said measuring of the quantity of the motion, the quantity of the motion is obtained from a difference between

the pixels which are used when the filtering process is performed in said performing of the filtering process so as to generate the interpolation pixel.

43. **(New)** The deinterlacing method of claim 42, wherein in said measuring of the quantity of the motion, the quantity of the motion is obtained from a difference between pixels which are included in the forward and backward fields of the deinterlacing target field from among the pixels which are used when the filtering process is performed in said performing of the filtering process so as to generate the interpolation pixel.